

U.S. Patent Application Serial No. 10/826,501
Response filed May 22, 2009
Reply to OA dated January 22, 2009

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently amended): An electronic device having an optical system for capturing an image comprising:

a focusing mechanism for moving said optical system to an auto-focusing position or a fixed focus position;

a switch that functions as a focusing switch and also functions as a shutter switch, wherein said switch when operated orders a focusing action or orders capturing of the image;

[[and]]

a controller that decides whether the optical system is in a final lens position or not during a focusing action of said focusing mechanism due to said switch, and in the case where a shutter operation of said switch is performed under a state that the optical system is not in the final lens position, shifts said optical system to a fixed focus position from an auto-focusing position and takes a fixed focus image; and

an information presentation part that presents information showing that the image taken by the shutter operation is a fixed focus image,

wherein, during the focusing action, a focusing value is measured with an origin at a lens

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position where a focus position becomes an infinity, and if the measured focusing value is not smaller than a maximum focusing value, the decision is performed with making the measured focusing value into the maximum focusing value.

Claim 2 (Previously presented): An electronic device having an optical system for capturing an image comprising:

a focusing mechanism for moving said optical system to an auto-focusing position or a fixed focus position;

a switch that functions as a focusing switch and also functions as a shutter switch, wherein said switch when operated orders a focusing action or orders capturing of the image; and

a controller that decides whether the optical system is in a final lens position or not during a focusing action of said focusing mechanism due to said switch, and in the case where a shutter operation of said switch is performed under a state that the optical system is not in the final lens position, shifts said optical system to a fixed focus position from an auto-focusing position and takes a fixed focus image,

wherein said controller compares between a time required for bringing into focus in said focusing mechanism and a time from starting of the focusing action until starting of said shutter operation, and changes said optical system to said auto-focusing position or said fixed focus position based on a result of the comparison.

Claim 3 (Original): The electronic device of claim 1, wherein said switch is provided

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as a first switch, and a switch which is used in photographing by a fixed focus is also provided as a second switch separated from the first switch.

Claim 4 (Original): The electronic device of claim 1, wherein said switch functions as said focusing switch at a state of a half-push and functions as said shutter switch at a state of a full-push.

Claim 5 (Original): The electronic device of claim 1 further comprising:
a first housing part that has said imaging part;
a second housing part that has said switch; and
a coupling part that couples said first housing part and said second housing part so that the first and second housing parts can be folded up.

Claim 6 (Currently amended): An electronic device having an optical system for capturing an image comprising:

a focusing mechanism for moving said optical system to an auto-focusing position or a fixed focus position;
a switch that functions as a focusing switch and also functions as a shutter switch, wherein said switch according to a condition of operation orders a focusing action or the capturing of the image; [[and]]

a controller that decides whether the optical system is in a final lens position or not during

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a focusing action of said focusing mechanism due to said switch, and in the case where a shutter operation of said switch is performed under a state that the optical system is not in the final lens position, takes an image at a focus position in the middle of the focusing action; and

an information presentation part that presents information showing that the image taken by the shutter operation is an image at the focus position in the middle of the focusing action,

wherein, during the focusing action, a focusing value is measured with an origin at a lens position where a focus position becomes an infinity, and if the measured focusing value is not smaller than a maximum focusing value, the decision is performed with making the measured focusing value into the maximum focusing value.

Claim 7 (Original): The electronic device of claim 6, wherein said switch is provided as a first switch, and a switch which is used in photographing by a fixed focus is also provided as a second switch separated from the first switch.

Claim 8 (Original): The electronic device of claim 6, wherein said switch functions as said focusing switch at a state of a half-push and functions as said shutter switch at a state of a full-push.

Claim 9 (Original): The electronic device of claim 6 further comprising:
a first housing part that has said imaging part;
a second housing part that has said switch; and

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a coupling part that couples said first housing part and said second housing part so that the first and second housing parts can be folded up.

Claim 10 (Currently amended): A photographing control method of an electronic device having an imaging part which catches an image obtained through an optical system, and a focusing mechanism which moves said optical system to an auto-focusing position or a fixed focus position, comprising:

a process that detects a shutter operation in the middle of a focusing action of said focusing mechanism;

a process that measures a focusing value with an origin at a lens position where a focus position becomes an infinity, during the focusing action;

a process that makes the measured focusing value into a maximum focusing value if the measured focusing value is not smaller than a maximum focusing value;

a process that decides whether the optical system is in a final lens position or not during a focusing action of the focusing mechanism;

a process that detects said shutter operation and, if the optical system is not in the final lens position, switches to said fixed focus position from said auto-focusing position of said optical system under the focusing action; [[and]]

a process that takes a fixed focus image caught at said fixed focus; and

a process that presents information showing that the image taken by the shutter operation is a fixed focus image.

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Claim 11 (Original): The photographing control method of the electronic device of claim 10 further including a process that superimposes a focusing mark representative of a distance between a pictured object and the optical system on an image, in the middle of said focusing action, which is caught by said imaging part, and displays it.

Claim 12 (Currently amended): A photographing control method of an electronic device having an imaging part which catches an image obtained through an optical system, and a focusing mechanism which moves said optical system to an auto-focusing position or a fixed focus position, comprising:

a process that detects a shutter operation in the middle of a focusing action of said focusing mechanism;

a process that measures a focusing value with an origin at a lens position where a focus position becomes an infinity, during the focusing action;

a process that makes the measured focusing value into a maximum focusing value if the measured focusing value is not smaller than a maximum focusing value;

a process that decides whether the optical system is in a final lens position or not during a focusing action of the focusing mechanism; [[and]]

a process that detects said shutter operation and, if the optical system is not in the final lens position, takes an auto-focusing image caught by said imaging part in the middle of the focusing action; and

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a process that presents information showing that the image taken by the shutter operation is an auto-focusing image.

Claim 13 (Currently amended): A computer readable recording medium storing a photographing control program of an electronic device having an imaging part which catches an image obtained through an optical system, and a focusing mechanism which moves said optical system to an auto-focusing position or a fixed focus position, the control program comprising:

~~a step that detects detecting~~ a shutter operation in the middle of a focusing action of said focusing mechanism;

~~a step that measures measuring~~ a focusing value with an origin at a lens position where a focus position becomes an infinity, during the focusing action;

~~a step that makes making~~ the measured focusing value into a maximum focusing value if the measured focusing value is not smaller than a maximum focusing value;

~~a step that decides deciding~~ whether the optical system is in a final lens position or not during a focusing action of the focusing mechanism;

~~a step that detects detecting~~ said shutter operation and, if the optical system is not in the final lens position, switches to said fixed focus position from said auto-focusing position of said optical system under the focusing action; [[and]]

~~a step that takes taking~~ a fixed focus image caught at said fixed focus; ~~and~~
generating presentation information showing that the image taken by the shutter operation is a fixed focus image.

Claim 14 (Currently amended): A computer readable recording medium storing a photographing control program of an electronic device having an imaging part which catches an image obtained through an optical system, and a focusing mechanism which moves said optical system to an auto-focusing position or a fixed focus position, the control program comprising:

~~a step that detects detecting~~ a shutter operation in the middle of a focusing action of said focusing mechanism;

~~a step that measures measuring~~ a focusing value with an origin at a lens position where a focus position becomes an infinity, during the focusing action;

~~a step that makes making~~ the measured focusing value into a maximum focusing value if the measured focusing value is not smaller than a maximum focusing value;

~~a step that decides deciding~~ whether the optical system is in a final lens position or not during a focusing action of the focusing mechanism; [[and]]

~~a step that detects detecting~~ said shutter operation and, if the optical system is not in the final lens position, takes an auto-focusing image caught by said imaging part in the middle of the focusing action; and

generating presentation information showing that the image taken by the shutter operation is an auto-focusing image.

Claim 15 (Currently amended): An integrated circuit to which an imaging part catching an image obtained through an optical system and a focusing mechanism moving said

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optical system to an auto-focusing position or a fixed focus position are connected externally, comprising:

a detection part that detects a shutter operation in the middle of a focusing action of said focusing mechanism and a focusing value measured with an origin at a lens position where a focus position becomes an infinity, during the focusing action; and

a control part that decides whether the optical system is in a final lens position or not and, on the basis of a detection of said shutter operation of said detection part, switches to said fixed focus position from said auto-focusing position of said optical system under the focusing action and takes a fixed focus image caught at said fixed focus if the optical system is not in the final lens position,

wherein said control part makes the measured focusing value into a maximum focusing value to perform the decision if the measured focusing value is not smaller than a maximum focusing value, and generates presentation information showing that the image taken by the shutter operation is a fixed focus image.

Claim 16 (Currently amended): An integrated circuit to which an imaging part catching an image obtained through an optical system and a focusing mechanism moving said optical system to an auto-focusing position or a fixed focus position are connected externally, comprising:

a detection part that detects a shutter operation under a focusing action of said focusing mechanism and a focusing value measured with an origin at a lens position where a focus

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position becomes an infinity, during the focusing action; and

a control part that decides whether the optical system is in a final lens position or not and takes an auto-focusing image in the middle of the focusing action based on a detection of said shutter operation of said detection part if the optical system is not in the final lens position,

wherein said control part makes the measured focusing value into a maximum focusing value to perform the decision if the measured focusing value is not smaller than a maximum focusing value, and generates presentation information showing that the image taken by the shutter operation is an auto-focusing image.

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